MISCELLANEOUS.

144. [Transferred to Group Theory, Problem 1, p. 98.]

PROBLEMS FOR SOLUTION.

ALGEBRA.

198. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

Solve $2^{x+y}=6^y$; $3^x=3.2^{y+1}$.

199. Proposed by SAUL EPSTEEN, Ph. D., Chicago, Ill.

Solve $(x-a_1)(x-a_2)(x-a_3)(x-a_4)(x-a_6)=(x+a_1)(x+a_2)(x+a_3)(x+a_4)(x+a_5)(x+a_6)$.

GEOMETRY.

224. Proposed by WILLIAM HOOVER, Ph. D., Professor of Mathematics, Ohio State University, Athens, O.

The equations to two circles are $(x-a)^2+(y-b)^2=c^2$, $(x-b)^2+(y-a)^2=c^2$; give the length of their common tangent and *thence* the condition that the two circles may touch.

225. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Determine the sides of a triangle, given the lengths of (1) the three altitudes, (2) the three medians, (3) the radii of the escribed circles, (4) the radius R of the circumscribed circle and any two of the three quantities r=radius of inscribed circle, s=semi-perimeter, $\triangle$=area.

CALCULUS.

178. Proposed by SAUL EPSTEEN, Ph. D., The University of Chicago.

Evaluate $\int_0^{\frac{1}{2}\pi} \frac{d\phi}{1+\sin^2\phi}$

MECHANICS.

168. Proposed by M. E. GRABER, A. B., Instructor in Mathematics and Physics in Heidelberg University, Tiffin, Ohio.

In Bifilar Suspension W is the weight of the suspended mass, a and b the distances between the threads above and below, h the vertical height of the threads. If the difference in vertical components of tension is n times W and θ is the angle turned through in azimuth, momental resistance is $\frac{1}{4}(1-n^2)W(ab/h)\sin\theta$. [Perry's *Engineering*.]